



Determinants of Medication Adherence Involving People Living With HIV (PLWHIV) Devolved to Community Pharmacies in Rivers State, Nigeria.

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ABSTRACT

Background: The community-based approach was introduced as a means of debunking stable HIV -infected persons from the overwhelming load of PLHIV to ensure treatment success and maintain suppression of viral load, which requires lifelong adherence. The aim of this study is to assess the level and factors associated with medication adherence in PLHIV in Rivers state, devolved for treatment to community pharmacies.

Methods: This was a cross-sectional study of stable adult PLHIV who were devolved from RSUTH and receiving refill at community pharmacies, selected by purposive sampling. Structured, interviewer-administered questionnaires were used to collect data and subsequently analysed.

Results: A total of 124 respondents, with a female preponderance (56.5%) were interviewed. Prevalence of medication adherence in the study was 49.2%. High adherence levels were found in males, elderly, people on long-term ART and good family/social support, though statistically insignificant (p -value =0.55, $X^2 = 1.187$). The main reasons for missed pills were feeling depressed and forgetfulness. Statistically significant factors affecting adherence include the availability of pharmacists to answer questions ($p = 0.000$), which is strongly associated with better adherence and satisfaction with the service provided ($p = 0.007$).

Conclusion: This community pharmacy ART refill model of differentiated care needs proper monitoring and counselling and promoting family support for better clinical outcomes.

INTRODUCTION

The human immunodeficiency virus (HIV) infection has been a life-threatening phenomenon of great global public health concern with about 36.7 million people living with HIV as at 2016 of which, 52% resided in Sub-Saharan Africa.¹ Earlier considered a death sentence, the introduction of antiretroviral therapy (ART) has resulted in HIV infection becoming a manageable chronic disease.¹

As at 2018, Nigeria had the second largest burden of HIV in Africa with an estimated 3.4 million HIV positive persons with 1,090,233 of these receiving lifelong ART.² By 2019, Nigeria had an estimated HIV burden of 1.9 million people, the fourth largest in the world. Approximately 1.14 million of these people were on ART, giving a 60% ART coverage.³ The South-South zone of Nigeria (where Rivers State is located) has the highest prevalence of the disease with statistical values of 5.5%. This means that Rivers is one of the states in the country where the disease is endemic.⁴

Adherence to medications is the process by which patients take their medication as prescribed, further divided into three quantifiable phases: 'Initiation', 'Implementation' and 'Discontinuation'.⁵ It is a complex phenomenon that is susceptible to several influences. These variables can be separated into five categories: Social and economic variables, treatment-related factors, disease-related factors, patient-related factors, and factors associated with health care.⁶

Adherence is assessed through common methods like pill counts, self-reports, diary keeping, and electronic monitoring, each having its own strengths and limitations. An objective measure of adherence is typically defined as taking at least 95% of all prescribed doses, as this level has been shown to effectively maintain viral load suppression and prevent replication.⁵ Traditional adherence measures, such as self-reported adherence, have played key roles in ART implementation to date.⁷ Self-reported adherence is the most widely used method to assess adherence, particularly in real-world clinical settings.⁸ However, it has multiple limitations including social desirability and recall biases.⁸ Poor or non-adherence includes missing doses completely, taking drug doses at the wrong time or not complying with dietary requirements associated with a drug.⁷ This highlights a common reason for treatment failure which causes poor viral suppression, hence posing a potential risk of drug resistance. Researchers and clinicians have tried to enhance the accuracy of adherence assessments by combining self-reported adherence with pill counts and pharmacy refill data. However, this method requires more time, staff, and resources, and doesn't always result in greater accuracy. Pharmacologic measures, electronic adherence monitors, and ingestible electronic pills aim to provide objective insights into both overall adherence and adherence patterns, but these tools are costly and often not easily accessible.⁸ With ART medication adherence in Africa estimated at 77% and Nigeria, the third largest in the burden of HIV in sub-Saharan Africa, there is a challenge in ensuring

an optimal level of treatment adherence to prevent the development and spread of resistant strains of HIV.⁶ A high level of adherence is required to achieve the desired outcome of ART.⁸

In both the developed and developing world, the control of HIV infection using antiretroviral therapy (ART) has led to a significant reduction in the transmission, morbidity, and mortality of the infection.⁹ Treatment success requires both a sustainable supply of ART to clinics and lifelong adherence to treatment by patients.¹⁰ This emphasizes the need for efficient delivery of care, especially regular ART to the patients.

Until recently, the clinic-based model of care was the mainly promoted approach to disease control. The community-based approach was introduced as a means of debunking the overwhelming patient load of HIV-infected people. It started in the form of house-to-house testing. In Nigeria, Community pharmacists have shown preparedness to provide HIV/AIDS care.¹¹

As more people are being placed on treatment, the more the existing care facilities are getting overcrowded. Antiretroviral service delivery at community pharmacy presently known as community pharmacy antiretroviral refill programme (CPARP) was introduced to relieve the treatment site. Community Pharmacy Antiretroviral Refill Programme is a new community-based model. In this program, stable clients are devolved from hospitals and clinics to some selected community pharmacies for medication refill.¹² A stable HIV/AIDS patient, according to this program, is one who has been on ART for not less than one year, has a viral load of less than 1000 cells/mL and does not have a current opportunistic infection. In addition, the client must be on first-line agents and willing to be so devolved to the community pharmacy. After being devolved, the client receives medication from the pharmacy every quarter; and returns to the clinic every six months for clinical assessment.¹³ Laboratory evaluation (viral load determination) is also carried out at the clinic every six months for the first 12 months then every year subsequently. The services provided at the community pharmacies for the clients include chronic care screening, medication adherence monitoring, antiretroviral (ARV) refill, counseling and support, documentation, referral, and linkages.

The determination of factors affecting adherence is one of the several issues that can provide valuable information on which patients are at most risk of non-adherence and to develop strategies to improve long term adherence. Various factors have been reported to affect adherence to ART both locally and internationally and these include, absence/presence of social support resources, disease duration, ART duration, continuous and consistent information about ART regimen, forgetting, avoidance of side effect, avoidance of being seen (stigma), financial constraints, change of daily routine. Others are demographics like sex, age, marital status, occupation, residential area and such like.⁵ Though a similar study has been done in Port Harcourt, there has been no study on adherence among patients devolved to community pharmacies for ART creating a great need for information about adherence to ART administered to

these devolved clients in Rivers state of southern Nigeria.¹⁰ However a community based study of PLHIV on differentiated care in various pharmacies in Akwa-Ibom State of Nigeria showed a prevalence of overall satisfaction and adherence with the program of 92.16%.¹⁴

This study therefore aims to assess the level of medication adherence in PLHIV in Rivers state devolved for treatment to community pharmacies and to determine the factors associated with their adherence to monitor and improve their health care management.

METHODOLOGY

Study area:

The study was conducted at the antiretroviral clinic of the Family medicine department in RSUTH. RSUTH is one of the institutions that provide comprehensive antiretroviral services to PLHIV in the State Rivers State University Teaching Hospital, Port Harcourt a tertiary public health care facility in the South-South region of Nigeria. The hospital has the following departments; Internal Medicine, General Surgery, Obstetrics and Gynaecology, Ear, Nose and Throat, Ophthalmology, Family medicine and the Accident and Emergency department. It serves the people living in Rivers State and its neighbouring States. The hospital offers comprehensive care services including ART for HIV-infected patients. The adult ART clinic runs daily from 8:00 am to 4:00 pm and medication adherence is reinforced through adherence counselling and education.

Study Design and Duration: It was a cross-sectional descriptive study that lasted for 3 months.

Study population:

The study sample consisted of stable adult PLHIV devolved from RSUTH to receive refills at community pharmacies but returned to RSUTH for their six-month follow up visit.

Selection criteria

Inclusion criteria: Consenting devolved HIV clients (18 years old and above) who had spent up to 6months receiving refills at the community pharmacies.

Exclusion criteria: Those who had not spent up to 6 months in receiving refill at the community pharmacy or too ill to participate.

Sample size determination

Using the formula $n = z^2 (p) (q)/d^2$

Where: n = sample size for large population, standard normal deviate (z) usually set at 1.96 which corresponds to the 95% confidence level and a p-value of ≤ 0.05 , and p (prevalence) chosen from a cross-

sectional study of community pharmacies' ART program in Akwa-Ibom state, south- south Nigeria¹⁶ a minimum sample size of 113 was calculated and was approximated to 124 with 10% attrition addition (to increase the power).

Sampling method

The simple random sampling method (yes or no) was used to recruit devolved clients (who were receiving refills at various community pharmacies), during their follow-up visit at the RSUTH into the study. Adherence in this study was considered within the previous three months from the time of study and graded as *poor adherence* (had missed medications within the last 3 months) and *good adherence* (last missed medication more than 3 months ago or had never missed medication signifying $>95\%$.)

Data Collection Instrument

The instrument for data collection was a standardized, structured interviewer administered questionnaire. The questionnaire has sections comprising patient socio-demographic characteristics; adherence questions; client's knowledge of ART information on correct dosing and side effects as well as reasons for missed pills.

Data collection technique

The questionnaire was prepared in English language and administered by trained data collectors chosen from the volunteers working at the HIV unit. The interviews took place at the ART clinic of the Family medicine department. The respondents were informed of the objectives of the study. They were assured of the utmost confidentiality of their responses, and written consent was obtained before the interview. The right of the respondents to refuse participation was respected, with absolutely no negative consequences to them.

Data Analysis

Data generated from the questionnaire was sorted, coded, and analysed using Statistical Package for Social Sciences (IBM SPSS) version 22. Descriptive statistics were used in the presentation of results. Data were represented in percentages and graphs and then analysed using the Chi-Square test. Statistical significance was set at a 95% confidence interval with a p-value of < 0.05 .

Ethical Consideration: Ethical approval was obtained for this study, from the ethical committee of the Rivers State Hospital Management Board (RSUTH/REC/2021052).

Outcomes measured: The outcomes measured were socio-demographical data of clients, reasons for missed pills, family/social data, and medical and pharmaceutical data.

RESULTS

Table 1: Sociodemographic Characteristics of Participants

Sociodemographic factors	frequency- n (%)
<i>Gender</i>	
Female	70(56.5)
Male	54(43.5)
<i>Age range</i>	
<20 years	4(3.2)
20-39 years	67(54.0)
40-60 years	46 (37.1)
>60years	7(5.6)
<i>Marital status</i>	
Single	47 (37.9)
Married	63 (50.8)
Widowed/ Divorced	14 (11.9)
<i>Occupation</i>	
Unemployed	17(13.7)
Unskilled/business	73(58.9)
Technician/skilled artisan	12 (9.7)
Professional	22(17.7)
<i>Level of education</i>	
No formal education	4(3.2)
Primary education	7(5.6)
Secondary education	39(31.5)
Tertiary education	74(59.7)
<i>Period of years on ART</i>	
1-5 years	73(58.9)
6-10 years	46(37.1)
>10 years	5(4.0)

In the sociodemographic table, the highest preponderances were shown among the females (56.5%), age range 20- 39 (54%), married people (50.8%), unskilled/business people(58.9%) and those with tertiary education (59.7%)

The mean age range of participants was 2.45 years with a standard deviation of 0.655, while the mean period on ART was 1.45 years, with a standard deviation of 0.575.

Table 2: Frequency and Reasons for Missed Pills vs Gender

REASON FOR MISSED PILLS	GENDER		TOTAL	X ²	df	p-value
<i>Had Too Many Pills</i>	Male N (%)	Female N (%)	N (%)			
Never	37(41.6)	52(58.4)	89(100)	5.149	2	.076
Rarely	15(60.0)	10(40.0)	25(100)			
Often	2(20)	8(80)	10(100)			
Total	54(43.5)	70(56.5)	124(100)			
<i>Felt Depressed/ Overwhelmed</i>						
Never	33(41.8)	46(58.2)	79(100)	5.201	2	0.074
Rarely	8(32)	17(68)	25(100)			
Often	13(65)	7(35))	20(100)			
Total	54(43.5)	70(56)	124(100)			
<i>Hiding Your Medications from Others</i>						
Never	36(4.9)	50(58.1)	86(100)	1.420	2	0.492
Rarely	12(54.5)	10(45.5)	22(100)			
Often	6(37.5)	10(62.5)	16(100)			
Total	54(43.5)	70(56.5)	124(100)			
<i>Simply Forgot</i>						
Never	40(46.0)	47(44.0)	87(100)	3.319	2	0.190
Rarely	4(23.5)	13(76.5)	17(100)			
Often	10(50.0)	10(50.0)	20(100))			
Total	54(43.5)	70(56.5)	124(100)			
<i>Side Effects of Drugs</i>						
Never	40(47.1)	45(52.9)	85(100)	1.420	2	0.492
Rarely	9(37.5)	15(62.5)	24(100)			
Often	5(33.3)	10(66.7)	15(100)			

Table 2 shows the relationship between reasons for missed pills between genders. The most frequent reasons for missed pills in this study were feeling depressed or overwhelmed and simply forgetting,

accounting for 16.1% (n=20) of the population in each case. Males were found to have felt more depressed than females (65%).

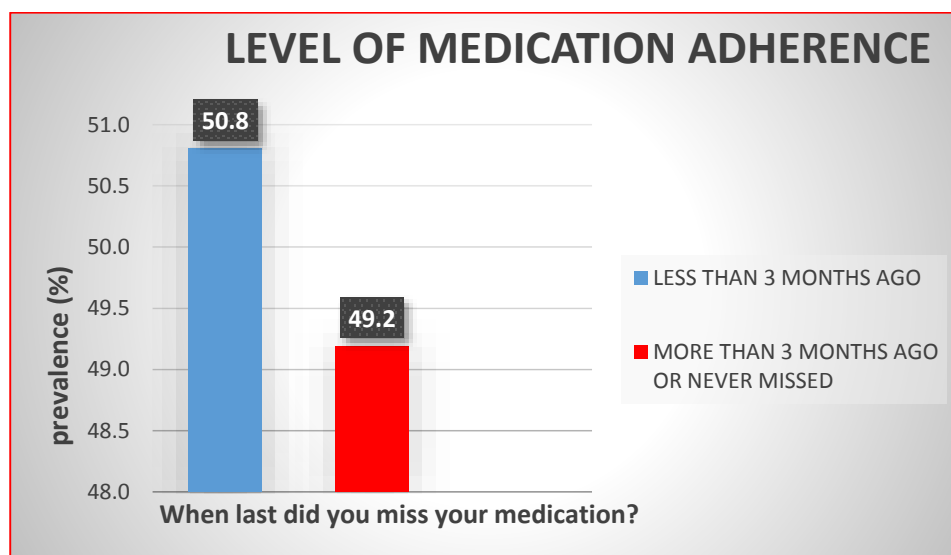


Fig 1: Level of Medication Adherence

Figure 1 shows the proportion of those who last missed their ART medication more than three months ago as 49.2%, while those who missed their medications within the last three months or less and were poorly

adherent as 50.8%. This therefore makes the level of medication adherence among PLHIV in this study 49.2%.

Table 3: Relationship between Level of Adherence and Sociodemographic Characteristics of Participants

SOCIO-DEMOGRAPHIC CHARACTERISTICS	WHEN LAST DID YOU MISS YOUR MEDICATIONS?		TOTAL N(%)	df	X ²	p-value
	Within last 3months (poor adherence) N (%)	> 3 months ago or never (good adherence) N (%)				
Gender						
Male	25(46.3)	29(53.7)	54(100)	1	0.779	0.378
Female	38(54.3)	32(45.7)	70(100)			
Age range						
<20 years	3(75)	1(25)	4(100)	3	2.356	0.502
20-39 years	34(50.7)	33(49.3)	67(100)			
40-60 years	24(52.2)	22(47.8)	46(100)			
>60 years	2(28.6)	5(71.4)	7(100)			
Marital status						
Single	27(57.4)	20(42.6)	47(100)	2	1.439	0.487
Married	30(47.6)	33(52.4)	63(100)			
Widowed/divorced	6(42.9)	8(57.1)	14(100)			
Level of Education						
No formal education	2(50)	2(50)	4(100)	3	0.136	0.987
Primary education	4(57.1)	3(42.9)	7(100)			
Secondary education	20(51.3)	19(48.7)	39(100)			
Tertiary education	37(50)	37(50)	74(100)			
Period of years on ART						
1-5 years	40(54.8)	33(45.2)	73(100)	2	1.187	0.552
6-10 years	21(33.3)	25(41.0)	46(100)			
>10 years	2(3.2)	3(4.9)	5(100)			
Occupation						
Unemployed	9(14.5)	8(13.1)	17(13.8)	1.611	3	0.657
Unskilled/business	39(62.9)	33(54.1)	72(58.5)			
Technician/skilled artisan	5(8.1)	7(11.5)	12(9.8)			
Professional	10(14.5)	13(21.3)	22(17.9)			

TABLE 4: Relationship between Patients' Adherence Level and Other Factors (Family/ Social Support, Medical)

FACTORS	WHEN LAST DID YOU MISS YOUR MEDICATIONS?		TOTAL	df	X ²	p-value	Fischer's exact test
	Within the last 3 months (poor adherence) N (%)	>3 Months ago or never Missed (Good Adherence N (%))	N (%)				
FAMILY/SOCIAL SUPPORT							
Yes	56 (48.7)	59(51.3)	115(100)	1	2.815	0.093	0.164
No	7 (77.8)	2 (22.2)	9 (100)				
MEDICAL FACTORS							
Availability of Pharmacists to answer questions							
Yes	50(45.0)	61(55.0)	111(100)	1	14.06	0.000	0.000
No	13 (100.0)	0 (0)	13 (100)				
Constantly receives adherence counselling							
Yes	60 (50.0)	60 (50.0)	120(100)	1	0.968	0.325	0.619
No	3 (75.0)	1 (25.0)	4 (100)				
Satisfied with service provided							
Yes	56 (47.9)	61 (52.1)	117(100)	1	7.182	0.007	0.013
No	7(100.0)	0 (0)	7(100)				

The table above analyzes the relationship between patients' adherence levels and other factors such as family/social support and medical factors.

Family/Social Support:

Of the patients who received family or social support, 56 (48.7%) had poor adherence (missed medications within the last 3 months), while 59 (51.3%) had good adherence (missed medications more than 3 months ago or never missed).

Among those without family/social support, 7 (77.8%) had poor adherence, while only 2 (22.2%) had good adherence. The Statistical Results of Chi-square (X²) value: 2.815 with a p-value of 0.093, and Fischer's exact test of 0.164, indicates no statistically significant relationship between adherence levels and family/social support.

Availability of Pharmacists to Answer Questions:

Among patients with access to pharmacists, 50 (45.0%) had poor adherence, and 61 (55.0%) had good adherence. All 13 patients without access to pharmacists (100%) had poor adherence, with none achieving good adherence.

Statistical Results of Chi-square (X²) value: 14.06, with a p-value of 0.000, and Fischer's exact test of 0.000 indicates a statistically significant relationship between adherence levels and the availability of pharmacists to answer questions.

Constantly Receives Adherence Counselling

For patients who consistently received adherence counselling, 60 (50.0%) had poor adherence, and 60 (50.0%) had good adherence. For those who did not receive consistent counselling, 3 (75.0%) had poor adherence, and only 1 (25.0%) had good adherence. Statistical Results of Chi-square (X²) value: 0.968, p-value of 0.325, and Fischer's exact test of 0.619

Interpretation: The p-values are greater than 0.05, indicating no statistically significant relationship between adherence levels and receiving adherence counselling.

Satisfaction with the Service Provided:

Among patients satisfied with the service provision, a higher proportion 61 (52.1%) had good adherence, while 56 (47.9%) had poor adherence.

All seven patients dissatisfied with the service had poor adherence (100%), with none achieving good adherence. Statistical Results of Chi-square (X^2) value: 7.182, p-value of 0.007, and Fischer's exact test of 0.013 indicates a statistically significant relationship between adherence levels and satisfaction with the service provided.

DISCUSSION:

High levels of adherence were seen among those with good social factors, older age groups, and long-term ART intake as in consonant with several other reported cross-sectional studies.^{6, 8} In this study, 'hiding their medications' was the rarest reason. This suggests a reduced stigmatization level, which may have been due to good social support and education on the nature of the disease as well as the importance of taking medication correctly. Most of the respondents missed their pills because of forgetfulness and depression. This was similar to reports from other Nigerian studies.^{18,19}

The prevalence of ART medication adherence in this study was 49.2%. This was lower than the national figure of 77%, in a study in Benin, which reported a prevalence of 83.3% and 79.5% in a Lagos study.^{17,18} This could be because of self-reported medication adherence which is also affected by recall bias.

Statistically significant factors affecting adherence include the availability of pharmacists to answer questions ($p = 0.000$), which is strongly associated with better adherence and satisfaction with the service provided ($p = 0.007$), where satisfied patients show better adherence. This agrees with the studies in Akwa Ibom state, Nigeria by Olorunsola et al and in Kwazulu- Natal by Chimbindu et al.^{16,17} Studies have shown that patients with access to pharmacists are more likely to have better adherence, agreeing with the results of our study.^{8,9,10} This shows poor access to a health care provider to be a major health disparity.

RECOMMENDATIONS

- Pill count should therefore be encouraged to combat forgetfulness.
- Community pharmacies, being the best structures are to be maintained to bring about this differentiated care with expectant better results of global ART coverage.

CONCLUSION

This community pharmacy ART refill model of differentiated care needs proper monitoring with regular adherence counselling, pill count, and encouraging accessibility of health care providers and promoting family support for improved medication adherence to produce optimal clinical outcomes among PLHIV.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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